

IOL Options in 2007

Every year, *Cataract & Refractive Surgery Today* convenes an IOL roundtable that is without any sponsorship from industry. Our goal is to confer with key opinion leaders who have a range of practices and viewpoints.

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PATIENT EDUCATION

Chang: For cataract surgeons who, like myself, do not perform keratorefractive surgery, we now have the formidable and unfamiliar challenge of how best to educate cataract patients about their menu of refractive IOL

options. How do you approach this?

Dell: An important consideration is to determine what the patient's current and future visual needs really are. We sometimes approach patients as anatomical speci-

mens, but we forget to find out what they really do day in and day out. If you ask patients in a systematic fashion what they want to see after surgery, you might get some surprising answers. For example, I have had some plano spherical patients who really just wanted to be myopic after surgery. Ordinarily, I never would have thought to ask that. It is a decision that maybe I would not make for myself, but there are patients who truly want this. Other patients who have successfully adapted to monovision over the years will probably be unhappy if you take that away from them with any combination of IOLs. I do my best to match various surgical options to the patient's stated goals by means of a systematic questionnaire (Dell Survey available at www.crstoday.com).

I think that there is a danger involved in giving patients a lot of IOL choices. They are coming to us as physicians because they want a specific recommendation. It is incumbent upon the physician to absorb the information—both historical and clinical—from the patient and say, “Based upon my examination and what you have told me, I believe the best technology for you is ‘blank.’” It needs to be a fairly unequivocal and definitive recommendation, or you risk losing the patient's confidence. If you present him with too many IOL alternatives, the patient comes away confused and thinking he may make the wrong choice.

McDonald: It is easy to confuse patients so they will not choose anything. My practice uses a three-staged approach. First, we mail them literature that asks whether spectacle independence is something they are interested in. We do not cloud the issue with pamphlets about all of the various processes, because we do not want the patient to feel overwhelmed.

The second stage occurs when patients visit our office for their preoperative evaluation. We ask if they are interested in being free of glasses after cataract surgery. If they do not indicate that spectacle independence is important, theirs becomes a routine cataract case. If they indicate an interest, they are given one of Steven's questionnaires to fill out. My staff then discusses with the patients two general categories for spectacle independence: (1) multifocality and (2) monofocal blended vision. The staff shows the patients a video from Eyemaginations, Inc. (Towson, MD), and explains the difference between multifocal and monofocal IOLs. If the patient requires astigmatic correction, this subject is addressed as well. The staff tells patients that all of the options are good.

In stage three, patients see me, and I ask whether either of the presbyopia-correcting options appealed to them. Their answer drives our discussion. I answer their questions and inform them of all advantages and disadvan-

tages. If they prefer multifocal IOLs, I review their responses on the questionnaire regarding occupation and tolerance of night halos and glare before making a recommendation. If patients prefer a monofocal approach, I briefly review the questionnaire and explain what they should expect. I reassure patients that, whatever their choice, I expect them to do well.

“If you present him with too many IOL alternatives, the patient comes away confused and thinking he may make the wrong choice.

—Steven J. Dell, MD

Wallace: Although I like Steven's form and my staff and I have used it, it is a little complicated for our patient base, so we have shortened and simplified it. I think his idea is right on, though, because it has given us good information that otherwise we would not have known. It is those simple little things including, “What sort of visual activity do you involve yourself in?” and “What are your hobbies?” It gets us on a great plane with our patients. We find out that many of our patients play golf or that they sew. When we comment on their personal interests, it is like a different world opens up. They feel that we understand their needs and that we really care. I think the form is a great idea, but I know that some surgeons feel it is not because patients really do not know why they are being asked to complete these forms. They do not know necessarily about the chance for a multifocal or accommodative lens. All they are being asked is what their visual activities are. After they check off how important it would be for them to get out of glasses, they may not know about newer surgical options. We have to look at this as one part of the whole piece. We also have a form that they fill out saying that they were informed about their options, and we check off the option they chose. This form lists three options: accommodative IOLs; multifocal IOLs; and blended vision.

Bucci: The first point I want to make is that there has been no distinction between cataract patients and refractive lensectomy patients. We discuss them as if they are the same, but they are very different. Refractive lensectomy patients are more like LASIK patients who do not want to wear reading glasses after refractive surgery.

I will talk about cataract patients here. When I enter

the examination room, I ask three basic questions. Are you interested in spectacle independence? If the patient says yes, I ask, would you be willing to put up with some light phenomena at night to gain that independence? Lastly, I ask, are you willing to pay some extra money for a deluxe implant? If I get three positive answers, then I have a thorough discussion about presbyopic correction with patients and determine whether they are appropriate candidates. I must be convinced that they really will tolerate nighttime visual phenomena. Then, I inform them of the specific process, what lenses would be suitable for them, and the advantages and disadvantages of each. For cataract patients, I say, "If you didn't have cataracts, you would pay \$4,000 an eye. Now that you have cataracts, you can get this for \$2,000 less per eye. Are you interested in this opportunity?"

Chang: Your point about defining the type of patient is very important. In my mind, there are three broad patient categories when discussing presbyopia-correcting IOLs.

Older patients typically will be quite happy simply to have their cataract fixed, and they have modest refractive expectations. Younger cataract patients, when provided with options, want to research and analyze them thoroughly. If they are under the age of 55, they have much higher expectations, because they have never experienced the loss of all accommodation. Refractive lens exchange patients do not really require any surgery, and therefore they have the highest expectations. Bruce, what do you do in your practice?

Wallace: It is not necessarily what the patient's response is on the form but also what the clinical picture looks like. Let's say we have a -2.00 D myope instead of a +2.00 D hyperope. Our surgical recommendations may vary, and, just like Steven said, we need to lead that patient in the right direction, because we have more knowledge than he does as to what is best for him. It is a complicated process. For one thing, we need to educate patients on something they know nothing about. Many people do not know what a cataract is, and they have not heard of all the choices for various IOLs. Patient selection is a time-consuming process, and we do not want to mislead anyone. Therefore, I really do not talk about spectacle independence. I talk about reducing patients' need for glasses. On my form, they initial a sentence that says, "I am aware that I may need to wear glasses after cataract surgery." This is done to avoid painting my colleagues and myself into a corner and suggesting to our patients that they will always be totally spectacle independent.

Chang: Is anyone using the literature provided by the IOL companies to educate patients?

Masket: I do, but I do it after conversation. In terms of approaching patients, one problem that I have in my practice is that probably fewer than 50% of patients who have surgery are candidates for presbyopia-correcting IOLs. I do not allow my staff to educate patients about these lenses until after my examination so that they are not disappointed. I also try to help patients understand that no decision they make is wrong but is a matter of personal preference. I do not live their lives, but I need to know more about their lives to help them make the right decision. After this conversation, we will use some of the companies' materials, including Web sites to continue their education. We also use testimonials from other patients who have had this type of surgery. The information that I give to patients starts the educational process and, I hope, gives them enough information to make their final decision.

Dell: All three manufacturers of presbyopia-correcting IOLs have produced educational videos that are fairly helpful in introducing the concept of these types of lenses. Whichever IOL you use most frequently, it may make sense to have the patient view a video of that particular technology so that, at least when they meet with the surgeon, they are talking the same language. Another thing I have implemented in the past year regarding my questionnaire is that the last question asks patients to rate their personalities from easygoing to perfectionist. I have the technician put a hash mark at the bottom of the page that indicates where the technician believes the patient falls on that spectrum, and then I sign the form where I think he falls on that spectrum. So, I have three pieces of information that sometimes do not agree well, but other times they are very congruent. Sometimes, this helps me when I get a phone call from the patient a few days later saying he has many additional questions about the procedure.

Masket: Although some patients may indicate a preference for physicians' decision making, I believe that it is my job to educate patients in order for them to make the appropriate personal decision. I tell them that I know what my needs are but that I may not fully understand their visual requirements. I discuss monovision, bilateral multifocals, and single vision distance and near options. I explain the strengths and weaknesses of all products as they relate to the individual's lifestyle, after which I help them reach their decision. If they opt for multifocals, I explain to them why I prefer the Acrysof Restor IOL.

(Alcon Laboratories, Inc., Fort Worth, TX) and what they are likely to experience with it. I exclude the multifocal in cases of high astigmatism, significant glaucoma, and macular degeneration. Furthermore, I discuss visual summation with similar implants in both eyes and how patients' visual performance is likely to improve after several months.

Dell: We have an incredible opportunity to grow this sector of the ophthalmic surgical universe. If you look at the top five elective medical procedures in all medical disciplines, LASIK is number one. If 20% of our patients adopt presbyopia-correcting IOLs, then number two would be these upgraded IOLs.¹ To have two of the top five elective procedures in all of medicine in our specialty is an extraordinary marketing opportunity for us. It is our job to steward the profession properly during this time of great opportunity.

Because we use multiple technologies at my practice, another helpful thing my staff and I have done is to adopt a name for presbyopic correction that patients can

understand. We purchased the right to use the copyrighted term *full focus* cataract surgery. Jay, I believe you are doing something similar with your blended vision concept. People have tried this with *PRELEX* (presbyopic lens exchange) as well. It is not as important what the phrase is, but I think it is helpful to refer to this as a group of technologies so that, if in 2 years we have a better IOL, we do not have to go back to square one in getting our patients to understand. Which IOL they get will be fluid, based on the available technology.

Wallace: I think that is an area where we have fallen short. It is a mistake that we have not had a single name for this procedure instead of just a name for the lens. I love Steven's idea of calling it a procedure, because it is more than a lens. It is IOL calculation, biometry, great surgery, effective astigmatic control, and great follow-up care. Calling it a procedure gets the patients off the idea that, if they have a postoperative problem, it is always due to the lens. There are other things that are involved here (eg, dry eye, posterior capsular opacification), so it

PRESBYOPIC CORRECTION IN EMMETROPEs

DAVID F. CHANG, MD

Cataract patients spend years adapting to worsening optics, and many consider a decreased dependence on spectacles to be an unexpected bonus. The opposite type of patient in terms of refractive expectations is nearly emmetropic and has no cataract but does not wish to wear reading glasses. Would you implant a presbyopia-correcting IOL in this individual?

FRANK A. BUCCI, JR, MD

I am conservative about placing multifocal implants in emmetropic presbyopes. If they have a strong desire to read without glasses, I will consider implanting a Rezoom IOL (Advanced Medical Optics, Inc., Santa Ana, CA) in their non-dominant eye. I tell patients that I am cautious about performing intraocular surgery on eyes with 20/20 distance vision, and I inform them that I will not proceed with surgery on their second eye for many months until I have observed the visual performance and neuroadaptation of their first eye. I also advise these patients that they will likely notice glare and halos when comparing the vision of both eyes. I strongly undersell the entire process. Doing so reveals which patients really hate their reading glasses and will likely do well.

Based on my experience with lensectomy patients, the Acrysof Restor IOL (Alcon Laboratories, Inc., Fort Worth, TX) does not do well in this situation. These patients find their near focal point to be too close, and they achieve no inter-

mediate vision with this IOL. They are also likely to notice a waxy quality to their vision. I have had excellent success with the Rezoom lens in these patients, because their neuroadaptation to the unilateral halos has proceeded more rapidly than I anticipated.

R. BRUCE WALLACE III, MD

Usually, this patient profile is younger, and these individuals hate the fact that they must wear glasses for near tasks. This is a segment of our population that is underserved when we say that these individuals are not good candidates. I think they are, if they hate reading glasses. Most of these patients have some form of lenticular changes. I will discuss contact lens options, conductive keratoplasty, LASIK, and other treatments that can be performed to mimic multifocal lenses. I generally use Rezoom lenses for a patient such as this one. I do not have a large series, but I do have a number of emmetropic presbyopes who have opted for surgical lens exchange and are very happy with their results.

I am not talking about a 45-year-old emmetropic presbyope. I am talking about a 50- to 55-year-old patient who is wearing glasses on a regular basis. It is not a cosmetic issue but one of inconvenience and lack of functionality. Many of them are not contact lens intolerant; they just do not want to wear them. There are a lot of people like this. Eventually, they are going to hear about IOL technology, and some will

would be wonderful if we had one name for all of these procedures that is true all over the world. The perfect example of this is when Chiron (now Bausch & Lomb, Rochester, NY) tried to market C-LASIK, because the company wanted it to be the Chiron product as a special branding for LASIK. The effort did not go anywhere. Right now, you can ask five random people if they know what LASIK is, and they all do. If patients were universally aware of a name for a surgical procedure for presbyopic correction, it would be so much easier for us to educate them. I would like a universal name that we can all use. *Refractive lens exchange*, in my mind, is a little hard for the public. We understand it, because we are in the field, but the lay public does not understand the term.

Dell: We licensed the term *full focus* from John Doane's group, Discover Vision Centers, in Kansas City, Missouri. They went through the copyrighting process to protect their intellectual property.

Masket: I use a different phrase, *seamless vision*, which

is really what patients want but what we cannot truly deliver at this time. I explain what the technology can and cannot do, and I attempt to underpromise and overdeliver.

Bucci: About 9 years ago, I heard the name *PRELEX*, and I said, "There is no way I am calling it that!" An hour after hearing the term, I came up with the term *MultiLx*. I have been using it for about 9 years now. It is a household name in my market. I took six words and made one word standing for clear lens extraction with multifocal lens exchange. It tells you what the procedure is. Two years ago, when the new lenses came out, we changed the name to *MultiLx Elite*.

Dell: Contrast your situation to if you had tried to brand the Array lens. You would have spent all that time, energy, and money talking about the Array, and then you would have had to rebuild that when another lens came out.

come to ophthalmologists seeking surgical options. Some of my happiest patients fall into this category.

SAMUEL MASKET, MD

In Los Angeles, we often say that a happy patient is an oxymoron. Given a demanding patient base, I must be certain that I can match this patient's expectations with a surgical approach. Frankly, I do not think that present IOL-based technology is adequate for the needs of the purely emmetropic presbyope. I typically treat those patients nonsurgically. I suggest contact lens monovision and refer them to a contact lens specialist. If they are optically successful with the monofocal contact lens but do not want to wear it, I will offer monocular laser vision correction but shy away from lens-based surgery. I always preface the conversation with a discussion about tradeoffs, because patients must be willing to trade distance in one eye for the ability to be free of glasses for reading.

STEVEN J. DELL, MD

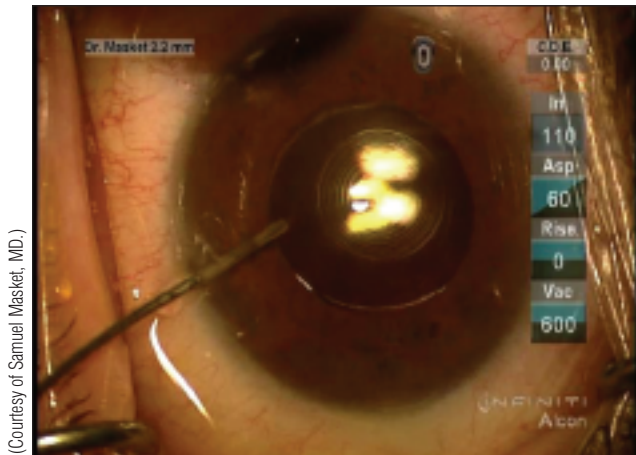
This is a tough patient. There are a lot of ways to make this patient unhappy. I think I would begin a contact lens trial for monovision, because, if he demonstrates an acceptance of some defocus in his nondominant eye, then there is a host of options. I might consider enrolling the patient in the Acufocus ACI 7000 (Acufocus, Inc., Irvine, CA) US clinical trial if he tolerates monovision. I might consider mini monovision with the Crystalens (Eyeonics, Inc., Aliso Viejo, CA) via refrac-

tive lens exchange. If the patient is nearing the age when cataract formation is inevitable, I would probably lean toward lens exchange-based versus laser-based surgery, because you cannot do customized laser ablation in a monovision capacity. Also, my experience with hyperopic noncustomized LASIK demonstrates a reduced quality of vision and predictability compared with what I can achieve with lens-based surgery. I think even doing a monofocal lens exchange for monovision is a better solution for this patient if he is highly motivated. This all depends, however, upon his accepting the defocus during a monovision contact lens trial.

One thing I mention to patients like this one is that they have a condition that is slowly deteriorating but that our technology is rapidly improving. It might be in their best interest to wait until those two curves intersect in a way that is positive.

J. E. "JAY" McDONALD II, MD

I work in a wide general practice with a huge contact lens practice. It has taught me so much about behavior through this age group, as my colleagues and I have gone through using multifocal and monovision contact lenses. I end up putting a significant number of patients such as this one in monovision contact lenses. I am not performing crystal clear emmetropic presbyopic lens surgery. We are doing some studies of the Acufocus ACI 7000 at my practice in patients who want something now and are willing to try a new, unproven technology. ■



(Courtesy of Samuel Masket, MD.)

Figure 1: The Acrysof Restor IOL is well centered at the close of surgery.

McDonald: When someone walks in with an ad—with a certain technology circled—it throws off your discussion. Periodically, I make sure everyone in my back office knows how I think and the explanations I am using. At my practice, one person coordinates “our position” and helps us refine our script. With every iteration, for a time, he will be the first person who encounters a patient. Every so often, he will stop each cataract patient at the front door and will sit down and talk with him. We want to learn how we are going to define the process and how we are going to help the patient come to a good decision efficiently. He and I then rework our script. Next, he trains the staff. This process has helped us create a more seamless process for what can be a complicated decision.

CURRENT PRACTICE

Chang: During the past year, the number one question I have been asked is, “Which presbyopia-correcting IOLs are you implanting, and how do you decide which to use?”

McDonald: I mostly use the Acrysof Restor IOL and also use the Rezoom IOL (Advanced Medical Optics, Inc., Santa Ana, CA). I am not doing any mixing and matching. Most of my efforts at spectacle independence are focused around aspheric monofocal IOLs.

Wallace: Currently, I use the Rezoom lens, usually implanted bilaterally. For the occasional patient disappointed with his near vision after surgery, I will consider implanting an Acrysof Restor IOL in his second eye. I sometimes use mixing and matching, although I would say in fewer than 20% of cases right now. Approximately 80% of the presbyopia-correcting lenses I implant are Rezoom IOLs. I do like the Crystalens (Eyeonics, Inc.,

Aliso Viejo, CA) for post-RK patients or people who have an occupation where they have to drive at night. Those are special patients who do not expect really good near vision but certainly like the idea of good intermediate vision. I think they do a lot better than I expected, especially with the Crystalens bilaterally. Right now, 15% of my lenticular surgery is multifocals. I do more blended vision than multifocals, although I am seeing a decrease in the former and an increase in the latter.

Bucci: I mix the Rezoom and Acrysof Restor IOLs 75% of the time and do Rezoom/Rezoom 25% of the time. I do not implant the Acrysof Restor IOL bilaterally.

Masket: Rationale comes from experience. During the late 1980s and early 1990s, there were approximately six multifocal IOLs going through the FDA investigational process. Only the Array lens (Advanced Medical Optics, Inc.) successfully completed the process and became available in the marketplace. I was involved as an investigator for the original Array, and I was an investigator and medical monitor for Wright Medical’s lens. I also participated as an investigator for the multifocal lens from Ioptex. As a result, I have considerable experience observing the behavior of multifocal IOLs.

“The number one question I [am] asked is, ‘Which presbyopia-correcting IOLs are you implanting, and how do you decide which to use?’”
—David F. Chang, MD

I used the Array lens extensively after it received FDA approval, and I watched my patients carefully. Interestingly, they seemed to be more accepting of that IOL early after its release than later, most likely due to higher expectations brought about by the advent of laser vision correction. A synthesis of the available literature indicated that fewer than 50% of patients achieved spectacle independence with the Array.²

Observing disappointment with the Array lens in my patient base, I did not think that the Rezoom lens would satisfy my typical patient. I was impressed, however, with the FDA investigational status for the Acrysof Restor IOL. When that product became available, I incorporated it into my practice (Figure 1). By and large, my experience has paralleled, if not exceeded, the FDA data. Every so often, I have had some interest in the Crystalens, but I have a somewhat skewed practice in Los Angeles, as a

high number of problematic cases come through or are referred to my office. Unfortunately, a number of patients unhappy with the Crystalens have caused me to shy away from its use. I am concerned about the size of the optic, that the silicone optic is not UV absorptive, that there is difficulty in predicting refractive outcome, and about a few other problems that are associated with the Crystalens. Nonetheless, I recognize that there are a lot of patients and surgeons happy with this lens.

Chang: I tend to choose the Acrysof Restor lens for myopes, for patients with large or small pupils, and for those who drive at night. This is the lens I use the most. The Rezoom lens does not provide near function with small pupils, and it creates more halos with large pupillary diameters. I did a study in my practice comparing my first 15 patients with bilateral Acrysof Restor IOLs and my first 15 patients with bilateral Rezoom IOLs. Sixty percent in both groups said that they noticed halos, but the severity rating was much higher in the Rezoom group (D.F.C., unpublished data, 2006). I still use the Rezoom IOL with hyperopes. I like that it is distant dominant and there is no reduction of contrast sensitivity in the central 2 mm. I tell patients that the Crystalens is a hybrid of a monofocal and a multifocal IOL. Of the three available presbyopia-correcting lenses, the Crystalens provides the best quality of vision and is a great option for people who are already happy with monovision but who want an expanded depth of field. Steven, what are you doing, since you are also using all three of these lenses?

Dell: I am using the Crystalens primarily. I have a scribe who is in the examination room with me, the same person virtually in all of my consultations. Sometimes, she will say something like, "I really thought you were going to steer this patient toward one lens, and you went with another. Why was that?" I think that the pupil's size has a lot to do with my decision process with multifocals. It is probably one of the most overlooked components in selecting a good Rezoom candidate. As David pointed out, the near performance is not good with the Rezoom lens in eyes with small pupils. Also, macular pathology is important. If I have any questions about the retina, I steer patients toward the Crystalens.

Regarding the Crystalens, the two things that bothered me most with the original AT45 are (1) I would like a little more accommodation and (2) I want the refractive predictability to be better. I have been using the new Crystalens 5.0, which I think should address these concerns in a positive way. The optic is bigger (5 mm) than the standard lens, and the sides of the plates are parallel

instead of trapezoidal, which allows the lens to slide in the pocket created between the anterior and posterior capsule. Additionally, there is greater contact between the plates and the back of the anterior capsule, which I think was the source of some of the refractive variability of the original Crystalens AT45. So far, the data from the Crystalens 5.0 indicate that accommodation is a little bit better than the traditional AT45, but the number of the new lenses that I have implanted and that have been implanted in general are too small to judge the Crystalens 5.0's overall performance. If the new model gives me tighter refractive predictability and more accommodation, then I think a little bit of monovision with this lens would probably become my go-to procedure for a large proportion of my patients.

I have had some luck with the Acrysof Restor lens. Implanted bilaterally, the IOL performs very well at near and fairly well at distance. I have had some patients who have described issues relating to the loss of contrast and waxy vision. That diffractive optic is like the triple amplifier of astigmatism. If you have any residual astigmatism, the patients' complaints are significantly out of proportion to that which you would hear with a monofocal optic or the zonal multifocal optic of the Rezoom lens. Intermediate vision is an issue with the Acrysof Restor IOL, and I believe Alcon Laboratories, Inc., is coming out with a lower-powered version of the lens that will address this issue. I have done a little bit of mixing and matching with the Rezoom/Acrysof Restor combination, but I have admittedly selected very easygoing patients.

Chang: In a conversation with me in 2006, I. Howard Fine, MD, reported greater refractive unpredictability for his refractive outcomes with the Crystalens. A personalized A-constant improves the average, but it does not reduce the standard deviation. If you have a hinged lens, how posteriorly the optic sits will depend upon the capsular bag's size and its interplay with the capsulorhexis' diameter. You can see these differences in the Crystalens/capsular bag fit all the time. Sometimes, I struggle to rotate the Crystalens because the bag is so small, whereas, in other eyes, it practically spins around during I/A. Eyeonics, Inc., is addressing this issue by making the lenses of lower dioptric power longer.

On the plus side, of the three available presbyopia-correcting IOLs, the Crystalens is the most forgiving of slight myopia (eg, -0.75 D). It simply improves patients' uncorrected reading ability at the expense of some distance acuity. A Rezoom patient with slight myopia can usually read quite well, although the lens will tend to increase the halo effect. However, slight myopia in an Acrysof Restor patient is going to produce very poor uncorrected per-

formance at near and far, and I believe this technology is the most unforgiving of small spherical refractive error.

Bucci: David, your comments about the Crystalens reflect why I have not been able to take that step and begin using the Crystalens. My 7- to 8-year experience with the Array lens has also influenced what I do now. I implanted 800 to 900 Array lenses, but I was very selective. I became impressed with the ability of the brain and the eye to neuroadapt. When I first started mixing the Acrysof Restor and Rezoom IOLs, I was still influenced by the halos. I put the Acrysof Restor in the patient's dominant eye, because I did not want the lens I thought had more halos in the dominant eye. Since then, I have become more impressed with the distance quality of the Rezoom lens and a little disappointed with the Acrysof Restor lens as far as the distance quality. I switched. Now, I implant the Rezoom in the patient's dominant eye and the Acrysof Restor in his nondominant eye.

I have implanted approximately 550 Rezoom and Acrysof Restor IOLs. I have an original cohort of 55 bilateral Acrysof Restor IOLs, but 35% of my patients had significant complaints about their intermediate vision. I think this speaks to my earlier comments. Almost 55% to 60% of my patients are lensectomy patients. If you want to test the performance of these IOLs, you need to test them in lensectomy patients. Their expectations are similar to or exceed those of LASIK patients.

There are four things you have to achieve for a happy patient: (1) good near vision in moderate and bright light; (2) good intermediate vision (the patient must be able to see his computer without spectacles); (3) high-quality distance vision; and (4) acceptable light phenomena at night. I tell patients that the Rezoom lens has half the halos of the Array lens. I have not had one discussion with my 250 Rezoom patients about explanting their lens. I have had to take out eight of 300 Acrysof Restor IOLs, and I am very resistant to removing lenses. Of 800 to 900 Array lenses, I took out two. All of the Acrysof Restor lenses that I took out were because of waxy vision rather than poor intermediate vision. So, I have become a little discontent with the Acrysof Restor because of (1) the quality of the distance vision, (2) the lack of intermediate vision, (3) the frequently too close near focal point, and (4) the fact that sometimes patients actually see a second image coming off the page.

I find that the strengths of each lens overcome the weaknesses of the other. The good-quality distance vision and the intermediate vision provided by the Rezoom lens covers up the problems of the Acrysof Restor IOL, which provides near vision that complements the Rezoom lens. I need to be less focused on pupillary size, because one

lens will allow the patient to read well with a large pupil in moderate light while the other works well with a small pupil in bright light. Having talked to many European and South American surgeons who use the Tecnis Multifocal IOL (not available in the US; Advanced Medical Optics, Inc.), I am really encouraged about its combination with the Rezoom IOL, because the Tecnis Multifocal lens provides better-quality distance vision compared with the Acrysof Restor lens. The Brazilian group has a large cohort of both combinations, and they have found that there is less halo and glare with Rezoom/Tecnis Multifocal versus the Rezoom/Acrysof Restor.³ There is also less dependence on the pupil, because the diffractive etchings are throughout the whole optic of the Tecnis Multifocal lens.

“If you make the patient see well, the brain is very forgiving of halos and glare. It is when he does not see well that he will complain.”

—Frank A. Bucci, Jr, MD

I have found that, if you make the patient see well, the brain is very forgiving of halos and glare. It is when he does not see well that he will complain. There is a big difference between 20/25 and 20/20. If you improve the distance that one line and make the vision sharper, he will have a greater capacity for adapting to the halos from the Rezoom lens. I do not feel that halos are the central issue with the Rezoom. I do have a specific exception to mixing. I have frequently observed in women aged 44 to 49 years that, if I implant the Rezoom lens first, they return 2 to 3 weeks postoperatively and can read a strong J1. If they are experiencing minimal halos, I will implant another Rezoom. I know they are going to get all of their reading with two Rezooms, and I want them to have the excellent-quality distance vision. I think their reading is superior, because their pupils are a little larger when they are younger.

I have 145 patients with the Rezoom/Acrysof Restor combination, and there has not been one major complaint about seeing a computer.

Dell: Our patients are spending more time on the computer than they are reading books, newspapers, and magazines. Intermediate vision is extremely important.

Wallace: A problem is that intermediate distance was not required for the FDA studies, so we do not have a lot of reliable data.

Bucci: Most cataract patients, aged 75 to 80 years, do not initially complain about intermediate vision. The more you pay, the more you expect.

Chang: That is an important point. Most cataract patients with realistic expectations will experience a “wow” factor with their first multifocal lens. If they are ecstatic, I am reluctant to point out the drawbacks in order to implant a different IOL in their second eye? My most common indication for mixing IOLs is when the first eye already has a monofocal IOL. The Acrysof Restor lens has a strong enough add to allow many such patients to read quite well with just the one eye. I agree with Frank that mixing multifocals is a stronger consideration for the patient with very high expectations, such as the refractive lens exchange patient. Mixing an Acrysof Restor IOL and a Crystalens is another good strategy. The latter provides quality optics, particularly at night, and provides good intermediate vision to complement the excellent near vision of the Acrysof Restor IOL.

Masket: There is the concept of mixing and matching with a monofocal and a multifocal lens. A number of patients have had a monofocal IOL in their first eye and present with a need for surgery in their second eye. They are often interested in the new multifocal IOL technology. Unlike Dr. Bucci, I have found that patients’ distance vision with the Acrysof Restor IOL actually matches closely with the quality of the vision achieved with a monofocal lens. Souza et al⁴ looked at two groups of patients, one with a monofocal control and the other with an Acrysof Restor lens. The investigators looked at logMAR visual acuity and found that the monofocal patients had the same level of vision all the way through 6 months postoperatively. The Acrysof Restor patients lagged behind until 4 months, but then their UCVA were statistically, clinically, and measurably indistinguishable from the monofocal control patients. The investigators also found that near vision improved in the multifocal group after 4 months, indicating some form of neuroadaptation, which we have not discussed. Furthermore, my clinical experience does not support poor distance vision with the Acrysof Restor lens, and there is good literature that corroborates my view.⁴ However, I have a few patients who have an Acrysof Restor lens in one eye and a distance monofocal in the other. In general, their degree of spectacle independence is not satisfactory. Therefore, I rarely offer that combination unless the patient fully understands its limitations. I have done it in some patients who had intermediate vision with a monofocal IOL in their fellow eye. That has been a good combination, because the monofocal allows patients to

see their computer or personal digital assistant well.

McDonald: Like Steven said earlier, I do not have many patients reading The New York Times online, but we forget that many blue-collar jobs involve some use of the computer. These individuals may not be using computers for pleasure, but they have to check part numbers, look up a phone number, or fill out a form on the computer. It is not just the older population getting more sophisticated; it is also the younger population that is being driven by demands at work to use intermediate distance.

I practice in Arkansas. It is a rural state with a high ratio of roads per capita. Many of my patients commute long distances to their jobs. During the winter, that drive is done in the dark. Night vision issues are their number one cataract complaint. Those are my 20/30 cataracts. They want a procedure that does not give them any issue with night vision.

I agree that neuroadaptation is not looked at enough. We are enamored with optics but forget that the visual cortex is an important component of spectacle independence after IOL surgery. I am a strong proponent of a monofocal strategy. I believe that, by not splitting the image monocularly (as multifocal lenses do), the visual cortex receives from each retinal sensor a full complement of raw visual data. If these data are not too different in spatial frequency (I try to achieve this by not separating the two eyes by more than 2.00 D), fusion occurs, and the resultant image is constructed with much more raw data. A superior final image should result, sometimes preserving stereopsis.⁵

Dell: The importance of intermediate vision is clear if you render yourself unable to see at intermediate distance with a pair of contact lenses. If you are presbyopic, put one eye for infinity and one eye at 13 inches. Try to do some work. Try to eat. It is actually maddening.

The second point I want to make is that, whenever I heard the term *neuroadaptation*, I thought that it was a euphemism for “your patients will get used to it.” Now, I believe that it is a real phenomenon. I think back to an experiment that I read about in medical school in which a group of volunteers was fitted with mirrored spectacles and saw the entire world upside down. After a couple of weeks, the inverting lenses were removed, and, for a period afterward, the volunteers still saw the world upside down.

McDonald: We really have not looked at the process involved or how we construct our optical strategies to maximize neuroadaptation. It drives me crazy when people—I am guilty of it as well—stand at the podium and say neuroadaptation will take place without understand-

ing what is going on in that process. If we come to understand neuroadaptation, we will be much more able to help our patients achieve what they want with the available optical products.

Dell: The point I want to drive home is that I always considered the concept of neuroadaptation a copout, but I think it is real.

McDonald: When mixing IOLs, as long as the Rezoom is in the patient's dominant eye and the lighting is bright, the person's distance vision is similar to but not quite as good as monofocal monovision. The same is true for the patient's nondominant Acrysof Restor eye with regard to reading. My guess is that this mix provides better vision than the same multifocal IOL in both eyes but would still be inferior to properly done monofocals with aspheric optics.

"It is a slippery slope to suggest that we can provide true, high-quality, seamless vision by mixing and matching current multifocal IOLs."
—Samuel Masket, MD

Masket: That is why I do not mix and match IOLs in patients who require surgery for both eyes. I think that cortical summation is a particularly important mechanism. There is literature about cortical summation, perhaps not about multifocality, but in terms of the benefits of binocular versus unocular cataract surgery.⁶ Also, there is the mechanism of cortical suppression, where a poorly seeing eye will interfere with the vision of an eye that sees well; this, too, has been studied.⁷

All of us have had patients who may have lost vision due to vascular occlusion or some other process that is inoperable or cannot be improved. They complain bitterly that the poor vision in one eye interferes with the vision of the sound fellow eye. I think it helps us in understanding the benefits or lack thereof of mixing and matching to look at those central mechanisms and understand how the brain works. As a species, we adapt well to gradual but not rapid change. If we allow multifocal products to function at their best, which requires symmetry, patients will gain the most benefit, with the understanding that there is a chance of some spectacle dependence for the occasional task. This may be manifest as reading glasses with the Rezoom

IOL or Crystalens or as glasses for intermediate distance with the Acrysof Restor lens. It is a slippery slope to suggest that we can provide true, high-quality, seamless vision by mixing and matching current multifocal IOLs. I would rather give patients the opportunity to see as well as they can for certain tasks, and, if occasionally necessary, provide spectacles for specific tasks. In this manner, patients are not compromising visual quality.

Bucci: My experience really goes against that. These people want to see in all three areas, and, with a refractive/diffractive IOL combination, you can achieve that 98% or 99% of the time. If you give patients only near and distance and no intermediate vision, they will be much less happy if they have to wear glasses, especially if they paid large sums of money. I have 55 people who have two Acrysof Restor IOLs, and I have 145 people with mixing. The mixing group has the LASIK "wow," whereas the other group is totally underwhelmed and not happy in general. My point is that it is not going to be perfect, but you can approach it. If patients can see at all focal points, neuroadaptation will be even more forgiving.

Wallace: It has been a great surprise, but everyone I talk with who has mixed and matched has not gone back. They like what they see, and those patients who are expecting something better after the first eye are given that. Patients do not understand what mixing or neuroadaptation means. I like to give them some confidence that unwanted visual images will likely go away over a few weeks or months. I use the analogy of wearing a ring, watch, or seat belt. If they were going to feel that way all of the time, would we continue to wear them? Our brains just learn to tune out these unwanted sensations.

Chang: I would like each of you to estimate what percentage of your cataract patients get presbyopia-correcting IOLs. For me, it is 10% to 15%, but, of course, so many in my referral population are not good candidates.

Masket: Fewer than half are routine. Of those to whom I offer the technology, probably 20% to 25%.

Dell: One third.

McDonald: Right now, about 60% of my patients become spectacle independent after cataract surgery using an aspheric monovision approach. Approximately 7% to 10% of those are using multifocal IOLs, and those are people with heavier cataracts who like the idea of multifocals.

Bucci: For me, it is 22% of all cataract patients.

Wallace: I think you have to carve out those patients who are candidates first. I use a fair amount of blended vision, so I would say that, of the group who are candidates, 25% to 30% are treated with presbyopia-correcting IOLs, and a good number—at least 50%—are treated with blended vision.

IMPROVING AS A SURGEON

Chang: A year ago, we were just starting to accumulate experience with presbyopia-correcting IOLs. Now, what one message would you emphasize for surgeons seeking to improve their results.

Bucci: We can talk about lens selection, but the biggest barrier to success that I see is the ability to correct residual refractive error. Some cataract surgeons are preoccupied with deciding what multifocal lens to implant. When the patient has 0.75 to 1.00 D of astigmatism, however, and the surgeons are really uncomfortable performing limbal relaxing incisions (LRIs) or LASIK or using microkeratomes, then there is a bigger problem. The surgeon selected the correct IOL and implanted it successfully. The patient, however, is only 20/30 without correction. He is unhappy, and the surgeon may stop implanting presbyopia-correcting IOLs, because he did not achieve outstanding satisfaction from the patient. We have to improve our skills to complete the process.

Masket: I would say the most important thing that surgeons need to know is how the lens works. If they do not, then they cannot possibly understand how to match it to patients' needs and how to make that lens perform its best in any situation.

Wallace: The surgeon and the staff need to come together as a team and develop a certain mindset of performing refractive cataract surgery. We have a golden opportunity, because we are already performing cataract surgery on monofocal patients. We have to fine-tune those cases in many areas, including IOL calculation and astigmatic control, and look at our results on a regular basis with all IOLs. Eventually, we will know we have all the tools to deliver the best result with presbyopia-correcting IOLs. Again, it is not about the lens only; it is about the procedure. All of these things have to come together if we expect to achieve patient satisfaction with presbyopia-correcting IOLs.

Dell: The phaco manufacturers tell me that, for every

cataract surgery pack they sell, 7% or 8% of vitrectomy packs are sold. So, there is an overall incidence of vitrectomy of approximately 7% to 8% in the general cataract surgery population. That is not compatible with a practice based upon these new IOL technologies. If you have a routine occurrence of vitreous loss, then there is an even higher incidence of radial tears in the anterior capsule, small tears in the posterior capsule, or a decentered eccentric capsulorhexis. All of those problems need to be cleaned up and substantially improved before we start getting fancy with these exotic implants. That is basic blocking and tackling that is not being done in a lot of cataract surgery practices. Also, if your biometry is not accurate, forget everything you have read thus far in this roundtable, because it is really of no value to you.

Chang: My suggestion would be to do a more thorough macular examination. With a bad cataract, a subtle macular problem does not matter quite as much if you are implanting a monofocal IOL. It becomes extremely important, however, with presbyopia-correcting IOLs; patients will be very unhappy to have spent several thousand dollars on a deluxe lens that did not work for them because of macular dysfunction.

“Patients will pick up on any lack of confidence on your part. The same goes for your staff.”

—J. E. “Jay” McDonald II, MD

You should check near acuity as well as distance vision preoperatively. Poor near acuity with a nuclear cataract is a cause for suspicion. The dilated super pinhole near vision test is probably the best potential acuity examination, and you should do a Goldmann contact lens examination if your view is compromised. Finally, consider ocular coherence tomography if there is any question about the macula. If you perform flawless surgery and achieve emmetropia but there was an unrecognized epiretinal membrane, both you and the patient will be very unhappy.

Masket: One thing we have not mentioned in patient satisfaction is gender. With my patients undergoing refractive lens exchange or receiving presbyopia-correcting lenses, for reasons that I cannot explain, I have noticed that men tend to be a happier group than women. I do not know if that observation is consistent in other markets.

“I will continue using LRIs as my primary method to reduce astigmatism. I will also use toric IOLs, depending on the pricing.”

—R. Bruce Wallace III, MD

McDonald: I would say to have all of the tools in your tool belt ready, because your patients will pick up on any lack of confidence on your part. The same goes for your staff. Then, the one piece of information I look at is the dotted graph across the bottom of Steven's questionnaire: Am I really particular, or am I pretty flexible? Know your patient, let him make the decision, and reinforce it. Prepare him for what can happen postoperatively. If you join hands with the patient and jump in the water together, you will be very successful. Then, pay attention to astigmatism and biometry.

Masket: You made an important point about holding hands with patients. This should not in any way be an adversarial relationship. I am going to do what I can do to make the patient achieve his goals, as long as they match with what I think I can deliver.

McDonald: The other thing that I do that makes my monofocal approach so strong is that I always give patients a fallback position. If they do not like blended vision in 3 or 4 months, I tell them I will fix it. That takes the pressure off them to always pick at what is wrong, because they know I have given them a way out. Most of them will not take it, even if their results are not quite what they expected. That has been one of the real successes in my practice.

TORIC LENSES

Chang: Another important refractive technology is the toric lens. What is your experience with toric IOLs? Which patients get a toric in your practice as opposed to LRIs?

Masket: I had initial experience with the STAAR Toric IOL (STAAR Surgical Company, Monrovia, CA), and some of the problems we spoke about, like the sizing of the Crystalens, were clearly reflected with the plate lens. I abandoned that IOL in favor of LRIs with a good degree of success, but the predictability of LRIs is still not as good as we need it to be. I have chosen not to charge for LRIs at the time of cataract surgery, because

that practice brings a certain degree of consumerism into routine surgery. I would rather perform LRIs as a value-added benefit, thus eliminating consumerism and chair time for a procedure in which I do not have full confidence.

I have had enough experience with the new Acrysof Toric IOL (Alcon Laboratories, Inc.) to know that, if I do my job right (eg, align the lens properly during surgery as indicated by the outstanding online software), that lens works quite well. Given my success with it, I will indeed give patients the option of paying for spectacle independence with toric IOLs once the Centers for Medicare & Medicaid Services allow us to charge for the upgrade.

McDonald: I have had really good success with the STAAR Toric IOL. For a 22.50 D or smaller eye, I feel comfortable that the lens will not rotate. I do charge for astigmatic correction. I feel very comfortable about LRIs and astigmatic surgery. I feel confident about addressing anything under 2.00 D with an incisional approach. I tell my patients that, at 6 to 8 weeks postoperatively, I will reevaluate their level of astigmatism. They may need a touch-up.

Wallace: It will be a horse race between the STAAR Toric IOL and the Acrysof Toric IOL, although the latter does seem to be a better product. I have sat in on some investigative meetings on that lens, so I know that it performed well in the FDA trials. I think the Acrysof Toric IOL will be used primarily by surgeons who have not embraced LRIs. I have been performing LRIs for many years. I developed a set of instruments and a nomogram. I have also been teaching courses on this technique for years, and LRIs do work if done properly. LRIs are safe if we do them the right way. They fit in well with multifocal IOLs, and I will continue using LRIs as my primary method to reduce astigmatism. I will also use toric IOLs, depending on the pricing. I know Alcon Laboratories, Inc., is expecting a new-technology IOL status from the Centers for Medicare & Medicaid Services.

Dell: One point I would like to make is that, when you are going to implant a toric IOL, you need to know what the corneal astigmatism is. You must get the tear film in good shape before you measure the eye for cataract surgery. One thing that has helped me in my premium IOL practice also helped my LRI practice: I get the patient's topography optimized before surgery. I put a high percentage of my patients on an oral omega-3 fatty acid as well as an artificial tear before they even

come in for their measurements. That approach has boosted the accuracy of my LRIs and keratometry significantly. Where the toric IOL fits in I am not really sure. I think there will be financial issues for surgeons. They will look at how good the results are compared with LRIs and what the financial burden is for the patient. Those things will all factor in to how successful that product is in penetrating the market.

Chang: I have been using the STAAR Toric IOL, and more recently the Acrysof Toric lens, in patients for whom LRIs are least effective or predictable. They are either younger patients or those with high amounts (eg, > 2.50 D) of corneal astigmatism. In contrast to the published literature with the shorter model, my own series of STAAR Toric IOLs had good rotational stability when the longer model was used.⁸ However, I am even more impressed with the Acrysof Toric IOL, which is more user friendly and avoids the need to use a plate haptic design. Compared with a silicone lens, the hydrophobic acrylic material makes the IOL more adherent to the capsule and provides immediate rotational stability. For 2.00 D or less of astigmatism, the decision to use LRIs or toric IOLs will depend on what the surgeon prefers and what the patient can afford.

McDonald: I have used a toric lens in combination with LRIs to correct up to 4.50 D of astigmatism. The result has been very satisfactory.

ACCOMMODATING LENSES

Chang: Several new accommodating lens designs are in development. If they are able to solve some of the shortcomings of current presbyopia-correcting IOLs, how soon will the lenses that we discussed today be obsolete?

McDonald: Every product has its life as far as wide use. What happens is, as products come out, we always try to overextend their boundaries. The nice thing about an accommodating lens is it maintains the full quality of vision and the image. If we can do something that allows us to go back to binocular summation with full quality in each eye, that will trump everything else for most patients. There will always be room for multifocal IOLs, but I think that accommodating IOLs are the hallmark that we are looking for.

Wallace: A lot of us have been involved with FDA trials for both multifocal and accommodating lenses. We realize that we are a little slow in the US at approving new products. That is both good and bad. Long before

the US has a product, we already know what it is capable of. We may have some knowledge of new products because of the FDA trials, but I am talking about getting our hands on premarket-approved IOLs. One accommodating IOL is proven already, and this type of lens is only going to become more popular. I am very excited about what I am seeing in the pipeline. My practice is going to be an investigative site for the Synchrony lens (Visiogen, Inc., Irvine, CA). It also was an investigative site for the Tecnis Multifocal IOL. It is a good product, and it is big in Europe. I think we have good things ahead for refractive lens procedures, just in time for aging baby boomers.

Dell: If we have an accommodating lens that provides 3.00 D of sustainable accommodation, then every multifocal lens is instantly obsolete. I think everyone agrees on that. Even the companies that are strongly committed to multifocality, if you look at their stable of patents, they are involved in accommodating IOL technology. I am sure that what we have today is not what we will be using in 5 years. These products will seem quaint by comparison to what we have in the future.

Chang: Besides the likely need for more demanding surgical techniques, I think an important challenge with accommodating lenses will be hitting emmetropia. I wonder if multifocals will not still be here 15 years from now, because they will be a lower-cost choice, they will have an established track record with no long-term questions, and they will be an option that perhaps does not require a perfectly sized capsulorhexis every time. Maybe this will become a tiered market, as with digital cameras, where the newest and best technology commands the highest premium, but older models can meet the needs of many people at a lower cost. I think the presbyopia-correcting market will always have room for several solutions. ■

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